

# **Audit**



# **Report**

OFFICE OF THE INSPECTOR GENERAL

**BA-5598 LITHIUM SULFUR DIOXIDE AND  
THE BA-4386 MAGNESIUM BATTERIES**

Report No. 93-115

June 18, 1993

**Department of Defense**

## **Acronyms**

CDD	Complete Discharge Device
CECOM	Communications-Electronics Command
DLA	Defense Logistics Agency
LSD	Lithium Sulfur Dioxide
NSN	National Stock Number
SINGARS	Single Channel Ground and Airborne Radio System
SOC	State of Charge
WRAP	War Reserve Automated Process



INSPECTOR GENERAL  
DEPARTMENT OF DEFENSE  
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ARLINGTON, VIRGINIA 22202

June 18, 1993

MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL  
MANAGEMENT)  
INSPECTOR GENERAL, DEPARTMENT OF THE ARMY  
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Audit Report on the BA-5598 Lithium Sulfur Dioxide and the BA-4386  
Magnesium Batteries (Report No. 93-115)

We are providing this final report for your information and use. This report addresses the Army's and the Marine Corps' management of the BA-5598 lithium sulfur dioxide and the BA-4386 magnesium batteries. The audit was requested by the Chairman, House Armed Services Committee, in 1992. Comments on a draft of this report were considered in preparing the final report and are included in Part IV, Management Comments.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. Therefore, we request that the Department of the Army and the Department of the Navy provide comments on the unresolved recommendations by August 18, 1993. DoD Directive 7650.3 also requires that comments indicate concurrence or nonconcurrence in each recommendation addressed to you. If you concur, describe the corrective actions taken or planned, the completion dates for actions already taken, and the estimated dates for completion of planned actions. If you nonconcur, state your specific reasons for each nonconcurrence. If appropriate, you may propose alternative methods for accomplishing desired improvements.

If you nonconcur with the estimated monetary benefits or any part thereof, you must state the amount you nonconcur with and the basis for your nonconcurrence. Recommendations and potential monetary benefits are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment. We also ask that your comments indicate concurrence or nonconcurrence with the internal control weaknesses highlighted in Part I.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. Raymond Spencer, Program Director, at (703) 614-3995 (DSN 224-3995). Copies of the final report will be distributed to the activities listed in Appendix H.

A handwritten signature in black ink, reading "Robert J. Lieberman", is positioned above the typed name.

Robert J. Lieberman  
Assistant Inspector General  
for Auditing



## Office of the Inspector General, DoD

Report No. 93-115  
Project No. 3AB-5008

June 18, 1993

### AUDIT REPORT ON THE BA-5598 LITHIUM SULFUR DIOXIDE AND THE BA-4386 MAGNESIUM BATTERIES

#### EXECUTIVE SUMMARY

**Introduction.** The Army Communications-Electronics Command (CECOM) is responsible for the supply management of batteries used in communications-electronics equipment for all Services. An inquiry was received from the Chairman of the House Armed Services Committee questioning the quantity of BA-5598 lithium batteries being procured by CECOM.

**Objectives.** The audit objectives were to evaluate the requirements for the BA-5598 lithium sulfur dioxide battery and to evaluate the adequacy and effectiveness of internal controls to ensure the accuracy of the requirements. We also reviewed the Army's and the Marine Corps' war reserve requirement process and storage, accountability, and disposal procedures for the batteries.

**Audit Results.** The audit disclosed three issues requiring management attention. Methods used to determine battery requirement quantities need improvement and internal controls are not adequate to preclude the procurement of excessive batteries. Guidance to the field activities on the proper storage, accountability, and disposal of the batteries is inadequate. In addition, maximum usage of lithium batteries is not being obtained.

- o The Army is procuring excessive quantities of lithium and magnesium batteries. As a result, the Army could unnecessarily spend as much as \$50 million to purchase additional batteries, when there are already excesses in the system (Finding A).

- o Lithium and magnesium batteries are not being stored, accounted for, or disposed of in a uniform manner throughout the Department of Defense. This condition results in confusion as to the proper shelf life of lithium and magnesium batteries and to the Services being unable to ensure that all batteries receive proper disposal (Finding B).

- o Frequently, the Services are not obtaining maximum usage from lithium sulfur dioxide batteries before disposal. As a result, the Services are incurring additional costs to purchase and dispose of batteries and historical demand is being inflated (Finding C).

**Internal Controls.** The audit identified material internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Internal controls were not effective to preclude procurement of excessive quantities of batteries (Finding A); require uniform storage, accountability, and disposal of batteries (Finding B); or prevent the disposal of batteries having a high residual capacity (Finding C). Additional details are provided in Part I of this report.

**Potential Benefits of Audit.** We estimated that the DoD could avoid as much as \$95 million in procurement cost by not procuring additional batteries when excesses are already in the supply system and by testing lithium batteries for remaining capacity before disposal (see Appendix F).

**Summary of Recommendations.** We recommended that inventories of batteries be conducted by Army and Marine Corps user activities and by the Defense Logistics Agency at the depots and all excesses be reported to CECOM. We recommended stronger internal controls to restrict the use of the lithium battery. We recommended the termination of a contract for magnesium batteries and that CECOM adjust future battery purchases to reflect accurate requirements. We recommended the implementation of uniform policy for proper storage, accountability, and disposal of lithium and magnesium batteries. In addition, we recommended the procurement of lithium battery testers and that user activities be required to test the batteries before disposal.

**Management Comments.** Management comments to the draft report were generally responsive but did not fully comply with the requirements of DoD Directive 7650.3. The Department of the Army concurred with Recommendations A.1. and A.4.b. and were considered responsive. They nonconcurred with Recommendation A.4.a. and suggested an alternative action to comply with the intent of the recommendation but did not describe the specific details. The Department of the Army concurred with Recommendation A.4.c. but did not provide estimated dates for completion of the actions. The Army needs to respond to the final report with specific action and estimated dates of completion. The Department of the Navy concurred with Recommendations A.2., B.2., and C.2. but did not cite any action or identify a time when action would take place for Recommendation C.2. The Navy needs to respond to the final report with a specific action and date that such action will be accomplished. The Defense Logistics Agency concurred with Recommendation A.3. and comments were considered responsive. Final comments on these issues are requested by August 18, 1993.

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This report was prepared by the Acquisition Management Directorate, Office of the Inspector General for Auditing, DoD. Copies of the report can be obtained from the Secondary Reports Distribution Unit, Audit Planning and Technical Support Directorate (703) 614-6303 (DSN 224-6303).





## **Part I - Introduction**

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## Background

The Army Communications-Electronics Command (CECOM), Ft. Monmouth, New Jersey, is responsible for the supply management of most communications-electronics items. Everything is included, from elaborate electronic listening devices to the common backpack radio. In addition, CECOM manages the many types of batteries used in these items. Item managers within the Directorate for Materiel Management at the Communications-Electronics Command review the supply position for these items and adjust inventory levels as they deem appropriate.

The batteries managed by CECOM come in many sizes, shapes, voltages, and chemistries. Two of these batteries, the BA-5598 lithium sulfur dioxide (LSD) and the BA-4386 magnesium, are interchangeable as the power source for the PRC-77 backpack radio. The magnesium battery has been used in this radio for many years. Although the magnesium battery had a history of working well under most conditions, the Services felt that the battery had a problem when used during extremely cold operations. In 1977, the Army fielded the LSD battery, which could outperform the magnesium chemistry, especially in colder climates such as Alaska where the temperatures drop below minus 40 degrees Fahrenheit.

The Army also preferred the LSD battery because it was the lighter battery and had a longer useful life than its magnesium counterpart. However, the cost of the LSD battery is about three times that of the magnesium battery with less than a twofold increase in useful life. Also the LSD is considered hazardous waste unless it is equipped with a complete discharge device that is properly used. With or without the discharge device, the LSD battery requires special handling.

IG, DoD, Audit Report No. 87-074, "Battery Products," February 2, 1987, concluded that to avoid unnecessary costs, the Army's use of the LSD battery should be restricted to the absolute minimum. The report stated that use should be restricted to only areas of extreme cold (such as Alaska) or to equipment specifically designed for the LSD battery.

In May 1992, CECOM issued a solicitation for 234,000 BA-5598 LSD batteries with an option to buy 468,000 more to support the tri-Service demand. In June 1992, the IG, DoD, received a Congressional Inquiry questioning the proposed quantities in the Army solicitation. The specific questions and responses are

included in Appendix A. This report addresses the Army's requirement determination process, as well as the accountability, storage, and disposal processes for the LSD and magnesium batteries.

## Objectives

Our objectives were to evaluate the requirements for the BA-5598 LSD battery and the internal controls that were in place to assure the accuracy of that number. We also reviewed the requirement changes that have occurred during the past 4 years that would account for the large quantities in the planned procurement of these batteries. In addition, we reviewed the Army's war reserve requirement process and the hazardous waste disposal procedures for the BA-5598 LSD and the BA-4386 magnesium batteries. A discussion of the war reserve requirement process is in "Other Matters of Interest," page 5.

## Scope

The audit was performed from August 1992 through January 1993. We visited six Army and three Marine Corps locations and four Defense Logistics Agency depots where the majority of the batteries are stored. We interviewed Government personnel involved in the battery requirements determination process and examined relevant documents dated from 1988 through 1992 to determine battery demand histories. We visited user activities and reviewed quantities on hand and storage and disposal methods. We performed physical inventories at the user activities and at the Defense Distribution Depots. We compared the quantities counted with the balances on the depot records and the balances on the inventory managers' records. We reviewed disposal procedures at each activity visited and at the Defense Reutilization and Marketing Organizations. In addition, we evaluated internal controls related to the procurement quantity determination and battery management.

This economy and efficiency audit was performed in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. Appendix G lists the activities visited or contacted during the audit.

The Quantitative Methods Division of the IG, DoD, provided technical assistance for analysis of battery demand quantities.

## Introduction

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### Internal Controls

The audit identified material internal control weaknesses as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. Controls either were not in place or were generally ineffective at most activities visited during the audit. Controls were not effective to preclude procurement of excessive quantities of batteries; require uniform storage, accountability, and disposal of batteries; or prevent the disposal of batteries having a high residual capacity. Monetary benefits of \$95 million could be saved if these controls are strengthened. Recommendations 1., 2., and 3. in Finding A. and 1., 2., and 3. in Finding B. of this report, if implemented, will strengthen these controls. The senior officials responsible for internal controls within each Military Department and the Defense Logistics Agency will be provided a copy of the final report.

### Prior Audits

The Office of Inspector General, DoD, Report No. 93-010, "Assist Audit of the Management of Assets Returned From Southwest Asia," October 21, 1992, addressed the Army inventory managers' visibility over Army assets that were returned from Southwest Asia. Additionally it addressed the adequacy of the inventory managers' actions to adjust procurement quantities based on canceled requisitions and assets returned from Southwest Asia. The audit determined that there were significant differences between physical inventories at the Defense Distribution Region West (DDRW) Sharpe Facility and assets on the records of Army inventory managers. In addition, not all materiel receipt transactions for returns from Southwest Asia were recorded on the Army inventory managers' records. The audit report recommended that the Director, Defense Logistics Agency, and the Commander, Army Materiel Command, reconcile stock record balances and do research for the line items with stock imbalances of more than \$16,000. Additionally the report recommended that the Director, Defense Logistics Agency, and the Commander, Army Materiel Command, reconcile the Defense Depot Region West Sharpe Facility's and inventory managers' receipt transactions for materiel returns, process all unrecorded materiel transactions, and determine why the transactions were not recorded on the wholesale managers' records. It also recommended that the Commander, Army Materiel Command, ensure that Army inventory managers reduce supply system requirements based on materiel receipts for previously unrecorded inventory.

U.S. Army Audit Agency Report NR 92-703, "Management of Assets Returned From Southwest Asia, U.S. Army Communications-Electronics Command, Fort Monmouth, NJ," September 21, 1992, addressed CECOM's management of materiel returning from Southwest Asia after Operations Desert Shield and Desert Storm. The report concluded that supply activities had not reported about \$10.4 million in materiel returned from Southwest Asia to CECOM. In addition, several Army installations, divisions, and other activities had not reported excess items on hand to CECOM. Also, Sharpe Depot had unreported

items. The audit identified 300,000 excess BA-5590 batteries in the system. The report recommended that CECOM item managers be provided unrecorded asset information by the depots and that they consider the unrecorded assets when determining procurement decisions. The report further recommended that procurements of BA-5590 batteries be cut by at least 300,000 batteries.

The Office of Inspector General, DoD, Report No. 87-074, "Battery Products," February 2, 1987, addressed the Army's decision to replace batteries used in fielded equipment with more costly lithium sulfur dioxide batteries. The audit was expanded to address a tasking by the Wisconsin Congressional Delegation to evaluate environmental, safety, and economic questions. The audit determined that the Army's decision to replace old technology batteries, used in fielded equipment, with lithium sulfur dioxide batteries was cost-effective or operationally justified except in the replacement of a magnesium battery (BA-4386). The audit report recommended that the Army Deputy Chief of Staff for Logistics establish procedures to restrict use of the LSD battery to extreme cold weather areas and to new equipment that requires higher energy-producing batteries. Additionally, it recommended that all Services should issue guidance requiring the implementation of one-for-one turn-in and issue procedures for lithium batteries.

## Other Matters of Interest

The Army Materiel Command has developed a process for the procurement and management of war reserve stock for the Army. This War Reserve Automated Process (WRAP) was developed in-house by the Simulation Information Management Agency-West (SIMA-West) in St. Louis, Missouri, in 1979. WRAP is a process that determines the quantity and types of items that should be in the War Reserve. WRAP is used by every Army inventory control point to determine how many units of War Reserve material should be purchased. The WRAP process is currently very slow and cumbersome to use and involves a great deal of decisionmaker involvement to complete.

The results of WRAP have traditionally required large numbers of items to be purchased based on doctrine, sustainability, and projected failure rates. Generally money was not available to fulfill WRAP-computed requirements. Needs were filled at lower levels, consistent with the availability of funds and the risks involved for sustainment of battle caused by potential out-of-stock conditions for the various items.

Where the War Reserve stocks are needed is determined by the location of personnel and equipment under the various fighting scenarios. As the scenarios change, the number of units of stock items to keep at a given location should change. This change in stock levels and locations is especially important under the new and reduced threat situation in the world today.

Since WRAP has not been run for batteries and other consumables since before the fall of the Union of Soviet Socialist Republics, we doubt that the positioning

## Introduction

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of stock and the amounts required are anywhere near optimal levels. We feel that War Reserve requirements would decrease under current conditions, since the Army also has reserves associated with administrative and procurement lead times, as well as safety level stock. A battle against a small adversary would not require the kind of unreplenished sustainment that was present in previous Soviet and Chinese scenarios.

We found that there is no detailed understanding of the WRAP process itself, except at the central design agency, SIMA-West. The realization that the Army personnel interviewed talked around the process and that the process was run only sporadically, coupled with the feedback that WRAP results were rarely applied due to the lack of funds, would lead to a conclusion that something was wrong with WRAP results.

The extent to which WRAP influenced our audit is limited since only the lithium batteries have War Reserve requirements. The War Reserve requirements computed for lithium batteries contributed to the overall stock level for these batteries. Since stock levels for lithium batteries were extremely high, an improper WRAP calculation could be partially to blame. Also, since failure factors for batteries seemed to be driven, in part, by usage and turn-ins per fielded radio per unit time, the failure rate inputs to WRAP from the Balance of Sustainment Model might have been too high because of premature battery turn-ins.

## **Part II - Findings and Recommendations**

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## **Finding A. Procurement of BA-5598 and BA-4386 Batteries**

The Army is procuring excessive quantities of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries. This excessive procurement is occurring because the information used to determine battery requirements is not accurate. As a result, the Army could unnecessarily spend as much as \$50 million to purchase additional batteries when a surplus already exists.

### **Background**

The BA-5598 lithium sulfur dioxide (LSD) battery, National Stock Number (NSN) 6135-010-34-2239, and the BA-4386 magnesium battery, NSN 6135-009-26-8322, were used in approximately 10 pieces of equipment. This equipment included the Modular Pack Mine System (MOPMS), the UN/UGC-74 communication terminal, the Remotely Monitored Battlefield Sensor System (REMBAS), speech security equipment, and a few radar sets. However, most of this equipment was fielded in very low quantities and had a low demand for these batteries. The primary user of these batteries was a manportable field radio, the AN/PRC-77. The Army had 32,498 AN/PRC-77 radios and the Marine Corps had 14,100. The two batteries were used interchangeably as the main power source for the PRC-77 radio set. We were only able to identify one piece of equipment fielded since the 1987 IG, DoD, review, the MOPMS, which used the LSD battery. The fielding began in September 1992, but the number of MOPMS planned would not cause a significant increase in the quantities of BA-5598 batteries required. A breakdown of the users of these two batteries is shown in Appendix B.

### **Batteries Currently in the Supply System**

Our review found that excessive quantities of both lithium and magnesium batteries were in the Army supply system. The Army's current supply system contained more than 777,360 BA-5598 lithium batteries, valued at \$31,312,060, and 1,559,268 BA-4386 magnesium batteries, valued at \$18,843,193. The 1992 average monthly demand was 4,712 and 33,394 for the BA-5598 and BA-4386, respectively. The demand histories for both batteries is shown in Appendix C. This appendix includes the tri-Service demand and demands for foreign military sales, initial issue, and mobilization.

In May 1992, CECOM issued a solicitation to purchase 78,000 BA-5598 LSD batteries per year for 3 years. The solicitation also contained a 200 percent option, which, if exercised, allows for a total procurement of 702,000 LSD



## Finding A. Procurement of BA-5598 and BA-4386 Batteries

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batteries. This contract would cost, at a minimum, \$11.7 million and more than \$35 million if the full option were exercised. During our review, we requested that this solicitation be put on hold until the results of our audit were known. The Army honored our request and, as our review progressed, CECOM canceled the solicitation.

In July 1992, CECOM awarded a contract for the BA-4386 magnesium battery. That contract was for 600,000 batteries the first year at a cost of \$6.8 million and options to purchase an additional 450,000 batteries the second year and 300,000 in the third year. A total of 1,350,000 magnesium batteries costing more than \$15 million could be purchased under this contract if the options are exercised.

### Quantities of Batteries on Hand and Due-In

To determine the number of LSD and magnesium batteries in the system, we visited or contacted the largest users and depot storage activities of both batteries in the Army and Marine Corps. We inventoried both batteries and reviewed supply documents to determine the number that was due in at each location. We also determined the war reserve for each Service and the quantity of batteries in the Marine Corps' prepositioned supply ships. The results of our review are shown in Table 1.

Table 1. Quantity of Batteries

	<u>BA-5598</u>	<u>BA-4386</u>
User Activities Visited or Contacted	23,370	333,157
On Hand at Depots	532,349	517,698
Due-In to Depots	150,956	709,012
Marine Supply Ships	<u>70,685</u>	<u>0</u>
TOTAL	<u>777,360</u>	<u>1,559,867</u>

Approximately 471,489 of the 777,360 LSD batteries observed during the audit were needed for the war reserves: 203,000 for the Marine Corps, 178,000 for the Army, and 90,489 for prepositioned ships.

At the time of our review the lithium batteries were ordered under a plan that included a 6-month safety level, a 12-month administrative lead-time, and a 10-month production lead-time, for a total of 28 months stock-on-hand in addition to the required war reserves.

The remaining 305,871 lithium batteries were available or due-in to meet demand and to cover the 28 months for safety and lead-times. Since average

## **Finding A. Procurement of BA-5598 and BA-4386 Batteries**

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monthly demand was projected to be 4,712 batteries, about a 64-months supply was available or due-in. Item managers should process buy orders when stock available and due-in drops below 28-months supply. Although CECOM actually had a 64-months supply, they solicited an additional buy for the lithium batteries. During the audit, CECOM reviewed the solicitation and the requirements and canceled the solicitation.

We also observed the order points and stockage levels for magnesium batteries, since these batteries were used interchangeably with the lithium batteries. At the limited number of activities we visited or contacted, we found 1,559,867 magnesium batteries on hand and due-in. We also determined that there was no war reserve requirement or safety stock requirement for this battery.

Administrative and production lead-time requirements totaled 11.5 months. The 1992 average monthly demand for magnesium batteries was 33,394. Therefore, at least a 47-month supply was on hand and due-in. If the current contract options are exercised, an additional 750,000 magnesium batteries will be available.

### **Battery Requirement Determination**

Funded requisitions for batteries were received by CECOM electronically. These requisitions were for the Services and for foreign military sales. The requisitions were monitored through CECOM's Requirements Determination and Execution System, which grouped the orders by Service and geographic location. This system generated reports which were used to determine battery demand and future procurement quantities.

The battery item managers monitored the levels of batteries at the depots as they filled the requisitions. Based on the monthly demand history and the supply levels of each battery at the individual depots, CECOM personnel determined whether additional battery purchases were necessary. This decision was also influenced by any new item which may be coming on line that will use the battery in question. Events around the world also played a large role in the procurement picture.

Our review showed that while the above methods used to determine battery purchases were good tools, the system contained inaccurate information because:

- o excesses at the user levels are not visible to the item manager;
- o depot records were not correct;
- o inadequate internal controls were in place to restrict the use of the LSD battery;

## **Finding A. Procurement of BA-5598 and BA-4386 Batteries**

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- o usable batteries were being destroyed because they were not tested before disposal; and
- o requirements were not being adjusted to reflect the decreasing demand for batteries.

### **Excess Batteries at User Levels**

We visited three Army and two Marine Corps activities identified as major users of the PRC-77 radio and major users of both batteries. We visited storage facilities and inventoried the batteries on hand. At some locations, we found large quantities of batteries being stockpiled.

At the Marine Corps Camp Lejeune, North Carolina, our review showed that for the BA-4386 magnesium battery, the requisitioning objective was 20,000 and the reorder point was 15,000. The average monthly demand was approximately 3,200 batteries. Our actual inventory of the BA-4386 showed that 94,806 batteries were on hand at the activity. A 29-month supply was on hand. We found large quantities of the BA-4386 on hand at several other locations. Supplies of this battery ranged from 30,080 at Camp Pendleton, California, to 122,240 BA-4386 batteries at the Marine Corps Logistics Base, Barstow, California.

Because CECOM does not have visibility at the user levels, they were not aware that such levels of batteries were on hand. To determine exactly where these assets are and exactly what the quantities are at each location, the activities should do a complete battery inventory and report the results to CECOM.

### **Incorrect Depot Records**

During our review, we visited the four primary storage depots for these two batteries. We performed physical inventories of the batteries and found significant differences between the quantities counted and the assets on the records of Army inventory managers. We also found differences between the quantities counted and the assets on record at the depots.

Our inventory results based on physical counts of about \$28 million in inventory and a comparison of the Defense Distribution Regions (DDR) Depot Facilities' transaction history records with those maintained by CECOM showed inventory discrepancies on both of the batteries inventoried. The on-hand balances at the depots exceeded amounts recorded on the inventory managers' records in 50 percent of cases inventoried, totaling 316,321 assets valued at \$5.4 million.

## **Finding A. Procurement of BA-5598 and BA-4386 Batteries**

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The on-hand balances in the depots were less than amounts recorded on the inventory managers' records in three cases, totaling 1,609 assets valued at \$64,000.

A summary of our inventory results is shown in Appendix D.

### **Internal Controls Restricting the Use of BA-5598 LSD Battery**

IG, DoD, Audit Report No. 87-074, "Battery Products," February 2, 1987, recommended that procedures be established to restrict the use of the BA-5598 LSD battery to use only in extreme cold weather regions or to new equipment specifically designed to use the LSD battery. The Army agreed to the recommendations and stated that it would establish procedures to assure that these recommendations were accomplished.

Our review showed that the internal control established was a special project code which must appear on the requisition in order to receive a BA-5598 battery. We found that if the requisition was for a BA-5598 and did not have the special code, the requisition was canceled and returned to the customer with a copy of the message explaining the use of the project code. If the ordering activity returned the requisition with the special code, the order would be filled. There was no additional oversight and no further questions asked.

As a result, during 1991 and 1992, 77,245 BA-5598 LSD batteries were requisitioned and sent to various activities in the Continental United States and 25,000 sent to activities in Germany. Military activities in California, Georgia, Texas, Kentucky, and North Carolina received 42,000 of these batteries.

Because the internal control was not working, unauthorized users were receiving the BA-5598 batteries and distorting the demand picture.

### **Disposal of Useful Batteries**

Our review showed that the Services were not obtaining maximum usage from lithium batteries before disposal. Users were not required and, in most cases, were not testing batteries to determine remaining capacity. Army studies showed that 40 percent or more of the LSD batteries turned in for disposal had a residual capacity from 70 to 100 percent. This lack of testing resulted in the historical demand being inflated and CECOM purchasing excess batteries. This subject is discussed in detail in Finding C, "Testing of Lithium Batteries."

## **Decrease in Demand for Batteries**

We also found that CECOM has not adjusted purchases to account for a decreased demand for the LSD and magnesium batteries. The demand for both batteries decreased and was expected to decrease further for the following reasons:

- o Forecasted cutbacks in the European Theater and potential cutbacks in other active and reserve military units will affect future stockage considerations.
- o The PRC-77 radio is being replaced by the Single Channel Ground and Airborne Radio System (SINCGARS). The SINCGARS has already been fielded at some locations, with the remaining PRC-77 radios to be replaced by 1998. The new radio will be powered by a BA-5590 LSD battery.

Personnel at CECOM stated that although this decrease in demand was taking place, the exact amount of the cutbacks was unknown to them at the time of the audit. Therefore, battery purchases had not been affected by this trend because CECOM had chosen to wait before reducing battery purchases until exact reductions are announced.

## **Conclusion**

The Army's method of determining procurement quantities of batteries was faulty because it lacked total visibility of available assets. The historical demand was inflated for the reasons stated. In addition, internal controls instituted by CECOM did not assure the restricted use of the BA-5598 LSD battery. The excess batteries in the Army's supply system represented \$21 million. If the Army purchased the magnesium batteries under contract and issued the solicitation for the LSD batteries, an additional \$50 million would be spent unnecessarily because excesses already existed in the supply system. In our opinion, the solicitation for the BA-5598 lithium batteries should not be reissued and the contract for the BA-4386 magnesium battery should be terminated.

## **Recommendations for Corrective Actions**

1. We recommend that the Army Chief of Staff direct user activities to perform a one-time inventory of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries to compare to approved stockage requirements and report any excess quantities to the Communications-Electronics Command item manager.

## **Finding A. Procurement of BA-5598 and BA-4386 Batteries**

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2. We recommend that the Marine Corps Commandant direct user activities to perform a one-time inventory of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries to compare to approved stockage requirements and report excess quantities to the Communications-Electronics Command item manager.
3. We recommend that the Director, Defense Logistics Agency, conduct an inventory at depot storage activities of the BA-5598 lithium sulfur dioxide and the BA-4386 magnesium batteries, adjust stock balances accordingly, and report results to the Communications-Electronics Command item manager.
4. We recommend that the Commander, Communications-Electronics Command:
  - a. terminate the current contract for BA-4386 magnesium batteries;
  - b. adjust battery purchases to reflect accurate requirements; and
  - c. strengthen internal controls to restrict use of BA-5598 lithium sulfur dioxide batteries.

## **Management Comments and Audit Responses**

**The Department of the Army** concurred with comment to Recommendation A.1. They concurred with the intent of the recommendation; however, they stated that the inventory data are already available through the Selected Item Management System-Expanded portion of the Army's Total Asset Visibility System. The Department of the Army has directed Item Managers to cancel contracts based on Army retail excess.

The Department of the Army nonconcurred with Recommendation 4.a. which recommended termination of the magnesium battery contract. The Communications-Electronics Command determined that a contract termination was not in the best interest of the Government. However, to meet the intent of the recommendation, the Communications-Electronics Command is negotiating a new delivery schedule of these assets, which will stop the further growth of asset levels. They stated that the advantages of this alternative produce a cost avoidance and provide a contractual document by which orders could be placed.

The Department of the Army concurred with Recommendation 4.b. The Communications-Electronics Command has instituted a procedure so that future battery contracts will be based on requirements to compensate for unexpected changes in demands. They stated that the procedure will allow for some procurement stability, a better unit price, and unexpected drops in demand.

The Department of the Army concurred with Recommendation 4.c. The Communications-Electronics Command plans to reissue the policy statement for use of the BA-5598 lithium sulfur dioxide battery. They will also inform the

## Finding A. Procurement of BA-5598 and BA-4386 Batteries

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Air Force and Marine Corps, via message, of the potential cost savings associated with the Army's usage guidance for the BA-5598.

The Department of the Army commented that the monetary benefits should be reduced by \$35 million because the solicitation for the BA-5598 lithium batteries was canceled independently of this finding. The full text of the Department of the Army's comments are in Part IV.

**Audit Response.** We consider the Department of the Army's comments to be responsive. In Recommendation A.1., the Department of the Army stated that since our review they have brought on-line a system that will provide asset visibility at the user level. This action meets the intent of our recommendation. In Recommendation A.4.a., they nonconcurred with terminating the current contract for BA-4386 magnesium batteries. To meet the intent of the recommendation, they proposed the alternative of negotiating a new delivery schedule that will stop the further growth of the assets. We agree that this action will meet the intent of our recommendation if the 2 option years of the contract are not exercised. We request that the Department of the Army respond to our final report with comments on specific details of the new delivery schedule and how the option years of the contract will be handled.

We consider the Department of the Army's comments to be responsive to Recommendation A.4.b.

We consider the Department of the Army's comments to be responsive to Recommendation A.4.c.; however, we request that they respond to our final report with dates by which the policy statements will be reissued and the messages sent to the Air Force and the Marine Corps.

The Army's planned procurement of the BA-5598 lithium sulfur dioxide batteries was the reason that our audit was requested. During our audit, we asked that this solicitation be put on hold until the completion of our review. The solicitation was canceled during the audit, but after we had determined that excess quantities of the batteries existed in the supply system. We request that the Department of the Army reconsider the position on the monetary benefits.

**The Department of the Navy, Office of the Assistant Secretary (Research, Development and Acquisition),** responded for the Marine Corps Commandant. The response indicated that the Department is planning to take action to improve conditions found during the audit. The Department of the Navy concurred with Recommendation A.2., and the Commandant of the Marine Corps will send a message to user activities by July 31, 1993. This message will direct the activities to conduct inventories of on-hand batteries, correct inventory records, and compare results to locally determined requirements. Results will be forwarded to the Communications-Electronics Command. The full text of the Department of the Navy's comments is in Part IV.

**Audit Response.** We consider the Department of the Navy's comments to be responsive.

## **Finding A. Procurement of BA-5598 and BA-4386 Batteries**

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**The Director, Defense Logistics Agency** partially concurred and acknowledged that in the past inventory functions were not fully executed at the depots cited in the report. The Defense Logistics Agency concurred with the intent of Recommendation A.3., and stated that an inventory of the batteries had been conducted and the results reported to the Communications-Electronics Command. They further stated that recently they had implemented an aggressive inventory accuracy program that includes 100 percent location surveys, location reconciliation, and accomplishment of all required inventories. The full text of the Defense Logistics Agencies comments is in Part IV.

**Audit Response.** We consider the comments from the Defense Logistics Agency to be responsive.



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## **Finding B. Storage, Accountability, and Disposal**

Lithium and magnesium batteries were not being stored, accounted for, or disposed of in a uniform manner by the Department of Defense. This condition existed because no battery management plan adequately addressed policy, procedures, or guidance for the depots or user activities. As a result, there was confusion as to the proper shelf life of lithium and magnesium batteries and the Services cannot ensure proper disposal of all batteries. In addition, at one location the Defense Reutilization and Marketing Office (DRMO) personnel were not paying the lowest price for disposal of the batteries.

### **Background**

Lithium batteries clearly exhibit characteristics of reactivity. These characteristics include violent reaction with water, release of toxic gases, and a possible explosive reaction if subjected to heat. Because of this, lithium batteries require special handling and disposal. In addition, lithium batteries manufactured before 1989 must be disposed of as hazardous waste. Since 1989, the batteries have been manufactured with a complete discharge device (CDD) that, if activated, depletes the lithium from the battery in an environmentally safe manner. When the lithium is depleted, the battery can be disposed of in sanitary landfills, except in states that have additional restrictions.

According to CECOM technical information, lithium batteries contain high-energy and highly reactive materials. They also contain pressurized sulfur dioxide gas, which is highly toxic. This gas has a sharp, suffocating odor and is a corrosive and poisonous material. Even though the batteries are water reactive, if the batteries are involved in a fire, the principal concerns are to prevent the spread of the fire and minimize cell venting. Flooding the burning materials with water will cool the batteries, control the combustion of surrounding flammables, and reduce the hazards of the gas.

CECOM provided general guidance in "Army Supply Bulletin, SB-11" and "Technical Bulletin: TB-43-0130" on storage and disposal of batteries. However, as shown below, our review found that additional and more specific guidance and procedures are necessary. These bulletins state that LSD batteries shall be stored in a dry, well-ventilated, sprinkler-protected facility, if available. A noncombustible structure without sprinklers will be the second storage choice. Also, other hazardous materials shall be appropriately segregated from the batteries.

## **Finding B. Storage, Accountability, and Disposal**

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### **Storage**

During our review of storage facilities at the user activities, depots, and DRMO sites, we found that personnel responsible for lithium and magnesium batteries had conflicting views on proper storage procedures for both batteries. Some personnel believed that magnesium batteries should be stored in refrigerated facilities; other personnel thought that air-conditioned areas were all that were necessary; and one activity stored magnesium batteries in a non-ventilated metal building.

In some cases, lithium batteries were stored separately from other items and were clearly marked as hazardous materials, but often they were located in warehouses with other supplies and not labelled as hazardous material. One location was required by the local fire chief to store lithium batteries awaiting disposal in a sprinkler-protected building. Personnel responsible felt this was in conflict with previous lithium battery storage policies and covered the batteries with vinyl to protect the batteries if the sprinkler system was activated. Personnel at the activities visited informed us that they were aware that their batteries were not properly stored; however, proper storage facilities were not available.

There was no evidence of any coordination between CECOM and the Defense Logistics Agency (DLA) depots for uniform storage procedures. The CECOM technical bulletin recommends storing lithium batteries in a sprinkler-protected building. However, during our visit to one Defense Distribution Depot, we learned that personnel had been cited in a DLA Technical Assistance and Operational Review for having lithium batteries stored in a sprinkler-protected building.

Personnel responsible for the storage of batteries at the activities we visited were lacking specific procedures to be followed.

### **Accountability and Disposal**

Because of possible economic and environmental repercussions, the Services must account for all lithium and magnesium batteries to ensure proper disposal, as required by Federal, state, and local regulations. The liability for these hazardous batteries never passes from the Government, and individual base commanders are personally liable for all hazardous waste generated under their command, even after a disposal contractor has taken control of the material. Under the laws, Federal Government entities may be sued by state and local governments and citizen groups. In addition, fines and penalties may be levied against the generator of the hazardous waste.

Within the last year, Army tests concluded that the magnesium battery should also be classified as hazardous waste. A study conducted in January 1992 by Martin Marietta Energy Systems Incorporated for the Army concluded that

## **Finding B. Storage, Accountability, and Disposal**

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magnesium batteries exhibited the characteristic of toxicity because of the chromium contained in the battery. At the conclusion of the study, CECOM issued guidance to the field activities that magnesium batteries must now be considered hazardous waste. The manufacturer of the magnesium battery also conducted a study and determined that the battery did not exhibit toxicity. The manufacturer was not in agreement with the method used by the Army's test agent. At the conclusion of our audit field work, the Army was conducting another test, using different methods. The outcome of this toxicity test of the magnesium batteries was pending at the end of our review.

IG, DoD, Audit Report No. 87-074, "Battery Products," February 2, 1987, recommended that the Services establish a one-for-one issuance and turn-in procedure to ensure accountability and proper disposal of lithium batteries. At the military installations we visited, only one facility had implemented the recommendation and established the one-for-one turn-in system.

Our review showed that within DoD there was no procedure to ensure that batteries classified as hazardous waste were being disposed of properly. At some locations, the batteries were not disposed of as hazardous waste. For example, at one location we determined that for a 1-year period, 176,148 pounds of BA-5590 lithium and 238,608 pounds of BA-4386 magnesium batteries were used. This amount was determined by multiplying the average monthly usage rate by 12 months. At the same location, our review showed that DRMO disposed of a total of 66,075 pounds of lithium batteries and 122,645 pounds of magnesium batteries. Thus, 110,073 pounds of BA-5590 lithium and 115,963 pounds of BA-4386 magnesium batteries were unaccounted for. Because all lithium batteries were collected in one barrel for disposal, it was not possible to determine how many of each type of lithium battery were disposed of.

Our review also showed that at some locations the DRMO did not pay the lowest disposal cost available. We found that at two locations in North Carolina, two different prices were being paid for the disposal of the same lithium batteries. At one activity, we determined that all lithium batteries, including those with a complete discharge device, had to be disposed of as hazardous waste because of state regulations. The activity paid \$4.43 per pound for lithium battery disposal. At a second activity in North Carolina, we found that they had an agreement with the state and were able to dispose of lithium batteries containing a complete discharge device as routine waste at North Carolina sanitary landfills. In addition, they were paying only \$1.38 per pound to dispose of other lithium batteries.

## **Shelf Life**

Conflicting views existed among activities on shelf life extension of both the lithium and magnesium batteries. The BA-4386 magnesium battery has a shelf life of 4 years and the BA-5598 LSD battery has a shelf life of 5 years. All batteries were individually labelled with the manufacturing date. One BA-5598

## **Finding B. Storage, Accountability, and Disposal**

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LSD manufacturer included an expiration date in addition to the manufacturing date. However, a second manufacturer of this lithium battery included an inspect and test date instead of an expiration date. Some activities believed that when a battery reached either the expiration or inspect and test date that the shelf life could be extended for 4 years if the package was inspected and showed no sign of leakage. We found other activities believed the shelf life extension was 1 year, while still others believed that the batteries must be thrown away when they reached the expiration date. In an attempt to save money, many user activities issued expired batteries to troops for training purposes. Currently there is no published guidance on shelf life extension of lithium batteries.

## **Conclusion**

Lack of uniform guidance to the user activities and to the depots resulted in confusion about storage and disposal of batteries. It is important that all batteries that are issued are accounted for and properly disposed of because of their hazardous nature. Unless a one-for-one turn-in requirement is established and implemented, the Services cannot be certain that all batteries are disposed of properly. As a result, the DoD may be liable for fines if improper disposal is found.

## **Recommendations for Corrective Action**

1. We recommend that the Army Chief of Staff implement the recommendation from the Inspector General, Department of Defense, Audit Report No. 87-074, "Battery Products," February 2, 1987, to require a one-for-one turn-in and issue of batteries classified as hazardous waste.
2. We recommend that the Marine Corps Commandant implement the recommendation from Inspector General, Department of Defense, Audit Report No. 87-074, "Battery Products," February 2, 1987, to require a one-for-one turn-in and issue of batteries classified as hazardous waste.
3. We recommend that the Commander, Communications-Electronics Command, in the management of batteries under his logistical responsibility, develop, publish, and require proper distribution of a uniform policy for the proper storage, accountability, and disposal of lithium and magnesium batteries. The Commander also should expedite resolution of the dispute over the hazardous material status of magnesium batteries.

## Management Comments and Audit Responses

**The Department of the Army** concurred with comment to Recommendation B.1. They agreed that implementing such a procedure could help to control disposal of batteries classified as hazardous waste. They also proposed an alternative to increase awareness and management at the local level, and they have taken action to add a section to improve the guidance in AR 710-2, "Supply Policy Below the Wholesale Level."

The Department of the Army partially concurred with Recommendation B.3. and stated that the Communications-Electronics Command is willing to help commanders establish or revise local policy if requested. The Communications-Electronics Command is taking actions to improve the guidance in Supply Bulletin 11-6 and Technical Bulletin 43-0134. The Communications-Electronics Command has contracted for a magnesium battery toxicity study, and the resulting final report will provide the basis for future disposal recommendations to users.

They also noted that the Communications-Electronics Command is not the DoD single manager for batteries and that the recommendation should be to the Commander, Communications-Electronics Command, "in the management of batteries under his logistical responsibility..." The full text of the Department of the Army's comments is in Part IV.

**Audit Response.** We consider the Department of the Army's comments to Recommendation B.1. to be nonresponsive because the actions proposed do not require a one-for-one turn-in of the batteries. In our opinion a one-for-one turn-in is the only way that batteries classified as hazardous waste can be controlled and the Army can assure proper disposal. During our audit we were unable to reconcile batteries issued and batteries disposed. The Department of the Army incorrectly concluded that the thrust of our recommendation was increased awareness and management of batteries at the local level. The thrust of our recommendation, actually, is to assure that batteries classified as hazardous waste are turned in for proper disposal. Our position remains that a one-for-one turn-in is necessary. We ask that the Department of the Army reconsider its response to this recommendation and reply to the final report.

We feel that the actions taken in response to Recommendation B.3. meet the intent of the recommendation and are responsive.

## **Finding B. Storage, Accountability, and Disposal**

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**The Department of the Navy** responded for the Marine Corps Commandant. The Navy concurred in principle with Recommendation B.2., and will reissue the current Marine Corps policy which requires a one-for-one turn-in and issue of batteries classified as hazardous waste. They also suggested that for Recommendation B.3., the Communications-Electronics Command coordinate any proposed DoD storage, accountability, or disposal policies with the Commander, Naval Surface Warfare Center, Crane, Indiana. The full text of the Department of the Navy's comments is in Part IV.

**Audit Response.** We consider the actions taken in response to Recommendations B.2. and B.3. meet the intent of the recommendations and are responsive.

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## **Finding C. Testing of Lithium Batteries**

The Services were not obtaining maximum usage from BA-5598 and BA-5590 lithium sulfur dioxide batteries before disposal. This condition occurred because field activities did not have the equipment necessary to test these batteries and determine their remaining useful capacity. As a result, the Services disposed of useful batteries and incurred unnecessary purchase and disposal costs. If this practice continues, the Services will dispose of more than \$45 million worth of useful batteries over the next 6 years.

### **Background**

The useful life of a lithium battery varies depending on the type of equipment in which the battery is being used. In addition, battery life is also affected by extreme hot and cold temperatures. Until recently, the Services could only estimate the life remaining in batteries that had been issued and partially discharged. For example, the Services estimated that under normal conditions, and depending upon the equipment in which the battery was being used, the BA-5598 battery had an average life of 24 to 48 operating hours.

A state of charge (SOC) indicator has now been developed to measure remaining capacity in lithium sulfur dioxide batteries. Currently, these SOC units cost about \$6,000 each. These SOC units can be used to test the BA-5590 and the BA-5598 batteries.

The BA-5590 lithium battery is used in many more pieces of equipment than the BA-5598 and is in much greater supply. Therefore, we chose to include this battery in our review of lithium battery testing. The numbers of batteries tested and the costs of disposal developed in this finding include both of these lithium batteries.

### **Cost/Benefit Analysis**

In 1991, CECOM distributed SOC units to several activities that had a large number of lithium battery requisitions. These activities were asked to test their lithium batteries before disposal and report the results to CECOM. That study showed that 40 percent of lithium batteries turned in for disposal had 70 to 100 percent remaining residual capacity and 20 percent had between 30 and 70 percent remaining capacity. If a battery is disposed of with 40 percent or higher remaining life, the Army considers that battery wasted because that battery can be reused on future missions.

## **Finding C. Testing of Lithium Batteries**

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The report concluded that the SOC units generated enough operating and support cost savings to justify their investment cost. Based on expected contract purchases when the report was issued in October 1991, a net present value savings of \$45.06 million was estimated for FY 1992 through FY 1995 if the SOC units were used.

### **IG Analysis of the CECOM Study**

To determine whether the CECOM study results were justified, we reviewed the findings of one participant in the study: Fort Richardson, Alaska. Due to the extremely cold temperatures in Alaska, Fort Richardson was expected to consume lithium batteries at a higher rate than at other DoD sites.

We analyzed 2 years of battery testing with a SOC unit by reviewing battery test logs from Fort Richardson. We found that 35 percent of all lithium batteries returned for disposal had between 70 and 100 percent capacity remaining. We also determined that more than 59 percent of lithium batteries turned in had more than 40 percent capacity remaining. Appendix E shows the results of our review of the Fort Richardson battery testing.

### **SOC Equipment at Field Activities**

Our review found that only three activities currently were using SOC units. These activities were Fort Richardson, Alaska; Fort Wainwright, Alaska; and one unit at Camp Pendleton, California. The Army estimated that if an activity or unit can reduce the number of batteries purchased by 106 batteries, it will pay for the SOC unit in one year. The Army also estimated that the \$6,000 purchase cost for each SOC unit will come down as the units are purchased in larger quantities. Despite this knowledge, the Army had not required the use of SOC indicators at activities known to be large users of lithium batteries.

### **Disposal Cost Savings**

Another way SOC unit use can save the DoD money is through a reduction in lithium battery disposal costs. Undischarged lithium sulfur dioxide batteries are classified as hazardous waste. The BA-5590 and BA-5598 batteries manufactured since 1989 have a complete discharge device which removes the lithium activity and allows the batteries to be disposed of as standard waste in most states. Some states will not allow disposal as standard waste even with the discharge device. California, Rhode Island, Alaska, Minnesota, and



Washington have classified all lithium batteries as hazardous and do not allow disposal as standard waste. Alaska does not ever allow disposal within the state.

The average cost of lithium battery disposal was \$4.90 per pound; an estimated \$67 million will be spent on battery disposal for FY 1992 through FY 1995. The use of the SOC unit will decrease the number of batteries procured and, thus, will decrease the number of lithium batteries sent for disposal.

## Conclusion

As we have shown in Finding A of this report, the item managers for lithium batteries use historical demand to determine battery requirements and the number of additional batteries to purchase. Disposing of batteries with remaining useful lives caused an unnecessary increase in the demand pattern and affected future battery purchases.

Significant savings can be realized if the remaining capacity of BA-5598 and BA-5590 batteries is reduced to less than 40 percent before disposal. Cost savings are achieved through battery reuse and reducing the number of replacement batteries purchased. Cost savings are also realized through a reduction in hazardous waste disposal.

We identified 2,155,951 BA-5590 and 777,360 BA-5598 lithium batteries, with an inventory value of \$151,247,614 million, in the supply system at the time of our review. To account for the Army's estimated reduction in active forces of 25 percent over the next six years, we reduced that inventory value by one fourth to \$113,435,710. Using the reduced inventory value, we determined that if 40 percent of these batteries are disposed of with a remaining life of 70 percent or greater, \$45 million will be wasted over the next six years.

## Recommendations for Corrective Action

1. We recommend that the Commander, Communications-Electronics Command, determine the number of BA-5598 and BA-5590 batteries a field unit must use per year in order to realize a savings through the purchase of a state of charge unit and the implementation of a battery testing program.
2. We recommend that the Army Chief of Staff and the Marine Corps Commandant direct those field activities, for which a savings can be realized through battery testing, to procure state of charge units and establish a program to test their BA-5598 and BA-5590 batteries before disposal.

## **Management Comments and Audit Responses**

**The Department of the Army** concurred with Recommendation C.1. They have completed a study and have determined that any unit that purchases an SOC meter and reuses 100 BA-5590s or an equivalent number of BA-5598s would recover the cost of the SOC meter. The Communications-Electronics Command will publish an article in the "Supply and Maintenance Newsletter" to alert all users of the results of the study.

The Department of the Army concurred with comment to Recommendation C.2. They consider it inappropriate for the Army leadership to direct such procurement. They will send a message to Major Commands, with high battery usage to advise them that the meters are available and that their use could reduce battery costs.

The Department of the Army stated that the monetary benefits should be reduced to \$45 million because it is unlikely that battery usage rates will remain constant. The full text of the Department of the Army's comments is in Part IV.

**Audit Response.** We consider the Department of the Army's comments to Recommendation C.1. to be responsive; however, we request that they respond to the final report with a date by which the article will appear in the "Supply and Maintenance Newsletter."

We consider the Department of the Army's comments to Recommendation C.2. to be responsive; however, we request that they respond to the final report with the date by which the message will be sent to Major Commands.

We have considered the Army's comments regarding our estimated monetary benefits of \$60 million. In its response, the Army provided new information on the current projections for active end strength reduction and its effect on battery usage rates. Based on this information, we have revised the estimated savings.

**The Department of the Navy** responded for the Commandant of the Marine Corps and concurred in principle with Recommendation C.2. The Marine Corps is aware of the potential benefits of fielding the state of charge testers and is studying their cost effectiveness and feasibility as a mandated item. The full text of the Department of the Navy's comments is in Part IV.

**Audit Response.** We do not consider the Department of the Navy's comments to Recommendation C.2. to be responsive because they did not cite any action or identify a time by which an action would take place. A Department of the Army study has shown that the cost of state of charge units is declining and that the cost of the state of charge units is currently recovered when the Services reuse 100 BA-5598 or BA-5590 batteries. Therefore, we suggest that the Department of the Navy reconsider its position and respond to the final report with a specific action and date that such action will be accomplished.

## **Part III - Additional Information**

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## Appendix A. Questions of Congressional Interest

On June 3, 1992, the Chairman of the House Armed Services Committee wrote to the Inspector General, Department of Defense, requesting answers to questions concerning lithium sulfur dioxide batteries. The following is a breakout of the questions, with replies based on audit results.

**Question.** What are the actual tri-Service demands for the BA-5598 battery, including a breakdown of the requirements for new equipment fielded since the 1987 report?

**Response.** The actual tri-Service demands for the BA-5598 lithium battery from 1988 through 1992 were:

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
Army	71,743	98,800	121,692	118,791	32,205
USMC	30,584	43,782	41,605	192,065	8,194
USAF	5,586	2,254	13,077	17,673	7,272
Navy	<u>902</u>	<u>3,776</u>	<u>2,678</u>	<u>2,834</u>	<u>2,803</u>
Total	<u>108,815</u>	<u>148,612</u>	<u>179,052</u>	<u>331,363</u>	<u>50,474</u>

The quantities included in this chart only represent the tri-Service recurring and nonrecurring demands. Other demands for the battery for foreign military sales, initial issue, and mobilization are not included in these totals.

The new equipment fielded since the 1987 audit report is the Modular Pack Mine System (MOPMS). MOPMS fielding began in September 1992. The BA-5598 battery is used in the the trainer, the remote control and the mine. The mines use 1 battery each; 8,735 mines will be fielded. The trainers use 1 battery each; 140 trainers will be fielded. The remote controls use 1 battery each, and 2,041 remote controls will be fielded.

**Question.** Does this demand support the fixed requirement of 234,000 batteries for the next 3 years?

**Response.** The Army has purchased excess BA-5598 batteries and, after looking at the requirements again, canceled the solicitation for the 234,000 BA-5598 lithium sulfur dioxide batteries.

**Question.** What is the war reserve level for the BA-5598 battery?

**Response.** The Army has a war reserve requirement for 178,000 BA-5598 batteries, and the Marine Corps has a requirement for 203,373 BA-5598 batteries.

## Appendix A. Questions of Congressional Interest

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**Question.** Based on Defense force reduction, will the war reserve requirements for this battery be reduced and, if so, to what levels for the next 3 years?

**Response.** At the present time the requirements are not being reduced. The Army is aware of the planned force reduction but is not aware what or where those reductions will be. When this information becomes available, the Army will reduce the requirements accordingly.

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## Appendix B. Primary Battery Users

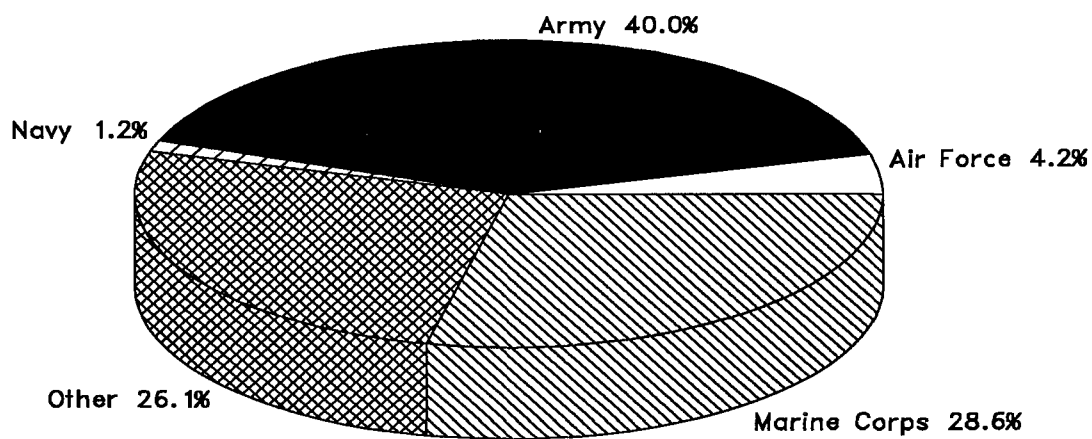


Figure 1. Primary Users of BA-5598 LSD Batteries  
1988-1992

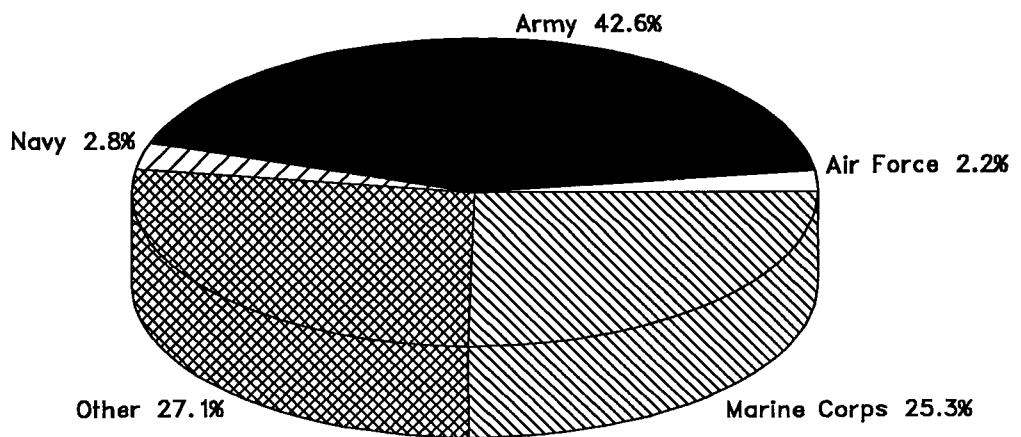


Figure 2. Primary Users of BA-4386 Magnesium Batteries  
1988-1992

## Appendix C. Battery Demand History

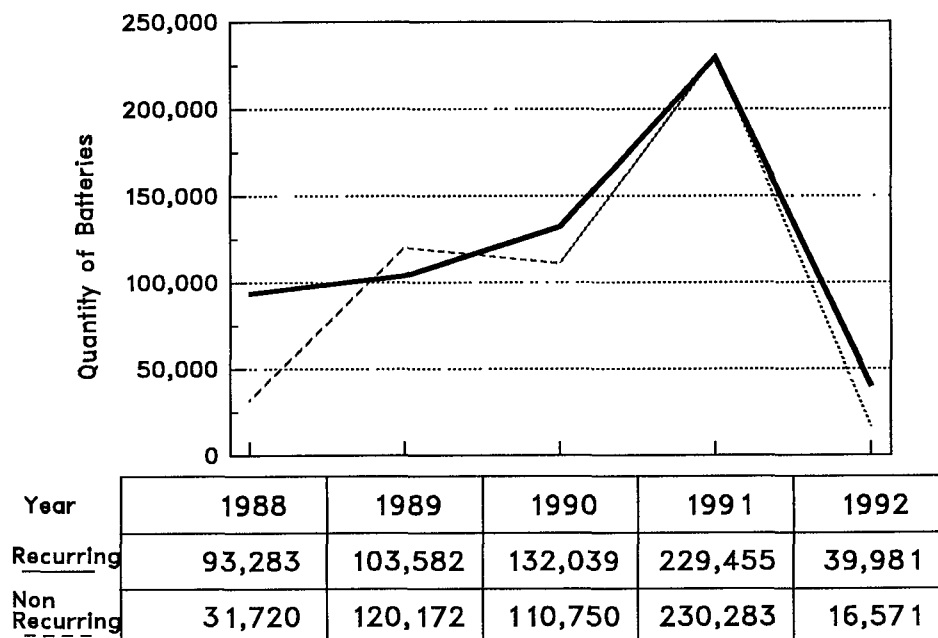


Figure 1. BA-5598 LSD Battery Demand History



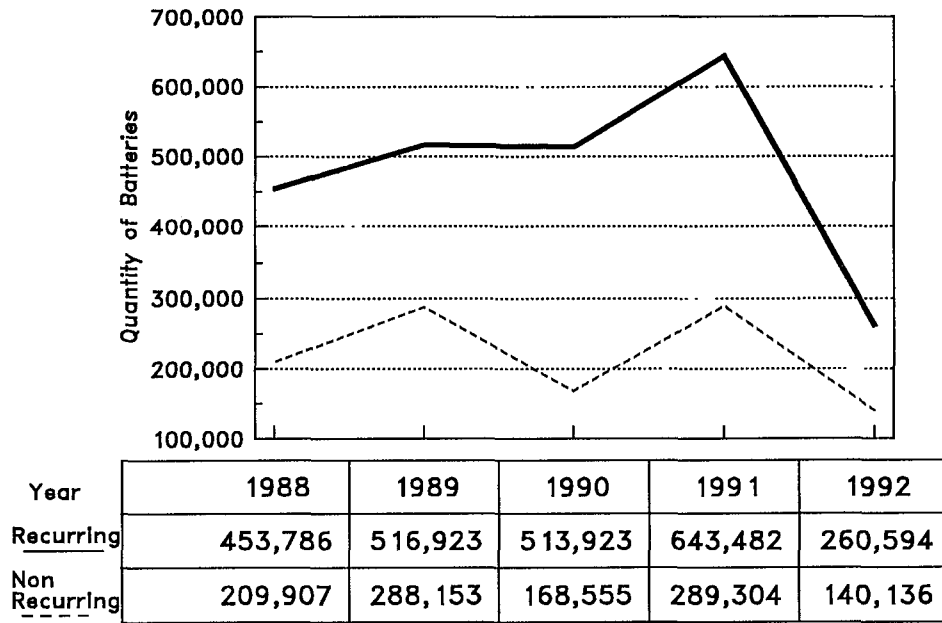


Figure 2. BA-4386 Magnesium Battery Demand History

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## Appendx D. Results of Inventory

Table 1. BA-5598 LSD Battery  
Unit Cost \$40.04

DLA DEPOT	AUDITOR PHYSICAL INVENTORY	CECOM RECORDS	DIFFERENCE	
			BATTERIES	VALUE \$
Sharpe	51,373	52,197	(824)	(32,993)
New Cumberland	1,027	1,051	(24)	(961)
Tobyhanna	455,831	408,510	47,321	1,894,733
Red River	24,118	24,879	(761)	(30,470)

TOTAL PHYSICAL INVENTORY 532,349 @ \$40.04 = \$21,315,253 VALUE

Table 2. BA-4386 Magnesium Battery  
Unit Cost \$13.06

DLA DEPOT	AUDITOR PHYSICAL INVENTORY	CECOM RECORDS	DIFFERENCE	
			BATTERIES	VALUE \$
Sharpe	265,176	80,781	184,395	2,408,198
New Cumberland	87,510	74,136	13,374	174,664
Tobyhanna	165,012	93,778	71,234	930,316
Red River	0	0	0	0

TOTAL PHYSICAL INVENTORY 517,698 @ \$13.06 = \$6,761,136 VALUE

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## Appendix E. Fort Richardson Battery Test Results

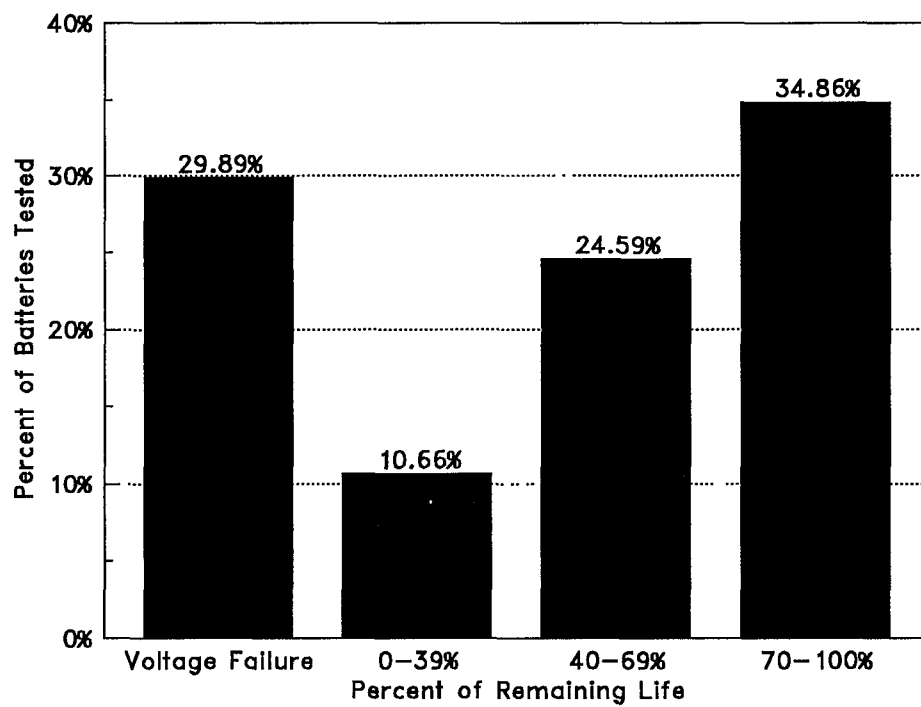


Figure 1. Fort Richardson Battery Test Results

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## Appendix F. Summary of Potential Benefits

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
A.1.	Internal Control. Provide visibility of assets.	Nonmonetary.
A.2.	Internal Control. Provide visibility of assets.	Nonmonetary.
A.3.	Internal Control. Provide visibility of assets.	Nonmonetary.
A.4.	Economy and Efficiency. Strengthen guidelines and procedures. Avoid expenditure for unnecessary batteries.	Funds Put to Better Use. \$50 million for FY 1993 through FY 1995 for Defense Business Operation Funds.
B.1.	Internal Control. Strengthen guidelines and procedures.	Nonmonetary.
B.2.	Internal Control. Strengthen guidelines and procedures.	Nonmonetary.
B.3.	Internal Control. Strengthen guidelines and procedures.	Nonmonetary.
C.1.	Economy and Efficiency. Strengthen procedures.	Nonmonetary.
C.2.	Economy and Efficiency. Avoid premature disposal of assets.	Funds Put to Better Use. \$45 million for FY 1993 through FY 1998 for Defense Business Operation Funds.

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## **Appendix G. Activities Visited or Contacted**

### **Department of the Army**

Army Material Command, Alexandria, VA  
Communications-Electronics Command, Ft. Monmouth, NJ  
Army Laboratory Command, Ft. Monmouth, NJ  
Fort Bragg, NC  
Fort Drum, NY  
Fort Richardson, AK  
Fort Wainwright, AK  
Army Audit Agency, Fort Monmouth, NJ

### **U.S. Marine Corps**

Marine Corps Systems Command, Quantico, VA  
Camp Lejeune, NC  
Camp Pendleton, CA  
Marine Corps Logistics Base, Albany, GA  
Fleet Marine Force, Pacific, Camp H.M. Smith, HI

### **Defense Agencies**

Headquarters, Defense Logistics Agency, Alexandria, VA  
Defense Distribution Region Central, Texarkana, TX  
Defense Distribution Region East, New Cumberland, PA  
Defense Distribution Region East, Tobyhanna, PA  
Defense Distribution Region West, Stockton, CA  
Defense Reutilization and Marketing Service, Battle Creek MI  
Defense Reutilization and Marketing Organization, Fort Bragg, NC  
Defense Reutilization and Marketing Organization, Fort Richardson, AK  
Defense Reutilization and Marketing Organization, Camp Lejeune, NC  
Defense Reutilization and Marketing Organization, Camp Pendleton, CA

## **Non-DoD Organizations**

Environmental Protection Agency, Washington DC

## **Contractor**

Rayovac Corporation, Madison, WI

Power Conversion International, Elmwood Park, NJ

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## **Appendix H. Report Distribution**

### **Office of the Secretary of Defense**

Secretary of Defense  
Under Secretary of Defense for Acquisition and Technology  
Assistant Secretary of Defense (Production and Logistics)

### **Department of the Army**

Secretary of the Army  
Chief of Staff  
Inspector General, Department of the Army  
Communications and Electronics Command  
Commander, Fort Bragg, NC  
Commander, Fort Richardson, AK

### **Department of the Navy**

Secretary of the Navy  
Commandant of the Marine Corps  
Assistant Secretary of the Navy (Financial Management)  
Comptroller of the Navy  
Commanding General, Marine Corps Logistics Base, Albany, GA  
Commander General, Camp Pendleton, CA  
Commanding General, Camp Lejeune, NC

### **Defense Agencies**

Director, Defense Logistics Agency  
Defense Reutilization and Marketing Organization, Battle Creek, MI  
Defense Distribution Region Central  
Defense Distribution Region East  
Defense Distribution Region West



## **Non-DoD Activities**

Office of Management and Budget  
U.S. General Accounting Office, National Security and International Affairs Division,  
Technical Information Center

Chairman and Ranking Minority Member of the Following Congressional Committees  
and Subcommittees:

Senate Committee on Appropriations

Senate Subcommittee on Defense, Committee on  
Appropriations

Senate Committee on Armed Services

Senate Committee on Governmental Affairs

House Committee on Appropriations

House Subcommittee on Defense, Committee on Appropriations

House Committee on Armed Services

House Committee on Government Operations

House Subcommittee on Legislation and National Security,  
Committee on Government Operations



## **Part IV - Management Comments**

**Department of the Army**

**Department of the Navy**

**Defense Logistics Agency**

# Department of the Army



DEPARTMENT OF THE ARMY  
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS  
WASHINGTON, DC 20310-0500



DALO-SMC

13 MAR 1993

MEMORANDUM THRU

~~DEPUTY CHIEF OF STAFF FOR LOGISTICS~~

SCAM  
14 MAR 93

~~DIRECTOR OF THE ARMY STAFF~~

14 MAR 93

MICHAEL L RAMIREZ, LTC, GS, ADAS

~~ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS, LOGISTICS AND ENVIRONMENT)~~

A Campo  
Assistant Deputy for Logistics  
CAMP (L&E)

FOR THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE (AUDITING)

SUBJECT: Draft Audit Report on the BA-5598 Lithium Sulfur Dioxide and the BA-4386 Magnesium Batteries (Project No. 2AB-5008)--INFORMATION MEMORANDUM

1. The HQDA Office of the Inspector General memorandum of 18 Mar 93 (Tab A) tasked ODCSLOG to respond to the subject report (Encl to Tab A).
2. The DODIG recommendations, and the Army position for each, are listed at Tab B. Paragraph numbers correspond to the DODIG Draft Audit Report, and only address Army issues.

2 Encls

*A. David Mills*  
A. DAVID MILLS  
Acting Director of Supply  
and Maintenance

CF:  
VCSA  
SAIG-PA

SAILE - Concur, COL Mallory/55225

Mr. David/78553

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LAS (1) 034X

DODIG DRAFT REPORT ON THE BA-5598 LITHIUM  
SULFUR DIOXIDE AND THE BA-4386 MAGNESIUM BATTERIES

FINDING A. Procurement of BA-5598 and BA-4386 Batteries

The Army is procuring excessive quantities of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries. This is occurring because the information used to determine battery requirements is not accurate. As a result, the Army could unnecessarily spend as much as \$50 million to purchase additional batteries when a surplus already exists.

ADDITIONAL FACTS

None.

RECOMMENDATIONS FOR CORRECTIVE ACTIONS

1. We recommend that the Army Chief of Staff direct user activities to perform a one-time inventory of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries to compare to approved stockage requirements and report any excess quantities to the Communications-Electronics Command item manager.
4. We recommend that the Commander, Communications-Electronics Command:
  - a. Terminate the current contract for BA-4386 magnesium batteries.
  - b. Adjust battery purchases to reflect accurate requirements.
  - c. Strengthen internal controls to restrict use of BA-5598 lithium sulfur dioxide batteries.

ARMY RESPONSE AND ACTION TAKEN

1. CONCUR WITH COMMENT. We concur with the intent of the recommendation; however, inventory data are already available through the Selected Item Management System - Expanded (SIMS-X) portion of the Army's Total Asset Visibility (TAV) system. Both batteries are SIMS-X reportable. The TAV system, which identifies authorized asset levels, actual asset levels, and excess assets, allows the item manager access to inventory levels down to the user level. For those units where TAV has identified excess batteries, their requisitions, for that battery type, are rejected until the excess is eliminated. SIMS-X data is reflected in the NSN Master Data Record File and is updated, on a transaction-by-transaction basis, from all Army customers. Item managers have been directed to cancel contracts based on Army retail excess.

4. a. NONCONCUR. Prior to publication of the DODIG's recommendations, CECOM investigated several alternatives to control inventory levels: one of which was the termination of the contract. Based on the data available, termination was determined not to be in the best interest of the government. This decision was based on three factors. First, on-hand or due-in assets above the Requirements Objective (RO) are within the Economic Retention Level. Current procedure is that all contracts for due-ins above the RO will be canceled unless approved for continuation by a division chief (GM-15/COL). The second factor was the cost, which was estimated to be \$460K (10 percent of the value of undelivered battery quantities) to terminate the contract. Finally, if the contract were terminated, known asset levels indicate a new award would need to be made in Sep 93: five months after termination. The new award unit price is expected to be higher.

In order to meet the intent of the recommendation, CECOM is attempting to stop the further growth of asset levels by negotiating a new delivery schedule. The new deliveries would approximately equal average monthly demand. The cost to accomplish this modification is estimated to be less than \$1.00 per battery, or approximately \$408K. The advantages of pursuing this alternative are: it produces a cost avoidance of at least \$50K; avoids the internal costs and higher contractual unit price associated with a new procurement; and provides CECOM with a contractual document by which orders could be placed in the future.

4. b. CONCUR. The CECOM C3I Logistics and Readiness Center instituted a procedure so future battery contracts will be based on requirements to compensate for unexpected changes in demands. Depending on the historic stability of the demands, a minimum quantity may be established, but in all cases this will be less than the projected demands. This will allow for some procurement stability, resulting in a better unit price, and still allow for unexpected drops in demands.

4. c. CONCUR. The internal controls established in 1987 to limit usage of the BA-5598 have been effective in reducing the demand for these batteries. Current CECOM procedure is that BA-5598 requisitions will only be honored: (1) when required by the end item; (2) in cold weather environments; and (3) in unique (i.e., lightweight, long lasting) mission requirements. Worldwide notification has been made periodically since its inception. CECOM plans to stress this requirement by reissuing this policy statement to the field through Logistic Assistance Representatives and the CECOM Supply Bulletin.

CECOM will also try to limit the Air Force and Marine Corps' usage of the BA-5598 battery. CECOM will be sending letters to these Services to inform them of the potential cost savings associated with the Army's usage guidance for the BA-5598. A suspense date has been established as 30 days after the date of the letter. If a favorable response is received, this requisition processing procedure will be extended to both Air Force and Marine Corps requisitions.

ARMY COMMENTS ON MONETARY BENEFITS

The DODIG stated that \$50M in cost avoidance could be obtained by canceling the BA-4386 contract and the solicitation for the BA-5598. Independent of this finding, the BA-5598 solicitation was canceled, thereby reducing the cost avoidance by \$35M. Because we expect procurement will be reduced by taking excess inventories into account, we believe the remaining \$15M can be considered as a cost avoidance.

FINDING B. Storage, Accountability and Disposal

Lithium and magnesium batteries were not being stored, accounted for, or disposed of in a uniform manner by the Department of Defense. This condition existed because no battery management plan adequately addressed policy, procedures, or guidance for the depots or user activities. As a result, there was confusion as to the proper shelf life of lithium and magnesium batteries and the Services cannot ensure proper disposal of all batteries. In addition, at one location, the Defense Reutilization and Marketing Organization (DRMO) personnel were not paying the lowest price for disposal of the batteries.

ADDITIONAL FACTS

The DRMO's name is improperly stated on line 9 of the above finding paragraph. It should be "Office" not "Organization". In addition, the conclusion paragraph on page 19 of the Draft report is misleading. We suggest that it be replaced with the following paragraph, which accurately reflects the battery disposal situation.

"Lack of uniform guidance to the user activities and to the depots resulted in confusion about storage and disposal of batteries. It is important that all batteries that are issued are accounted for and properly disposed of in accordance with federal, state, and local environmental regulations. Local battery user activities have failed to ensure implementation of uniform disposition and disposal guidance provided by CECOM. Unless user activities establish and implement stronger controls, i.e., a one-for-one turn-in requirement, effectively disseminate disposition and disposal guidance, and monitor compliance, the Services cannot ensure that all batteries will be disposed in accordance with environmental requirements. As a result, the DOD may be liable for fines if improper disposal is found."

The above Conclusion paragraph more accurately reflects battery disposal issues. Not all batteries are hazardous waste under federal, state, and local environmental regulations: and if batteries are recycled, they may be taken out of the waste stream (i.e., not a hazardous waste). CECOM has provided uniform disposition and disposal guidance via a publication entitled "Battery Disposition/Disposal Handbook", dated November 1988 presently in its second edition. CECOM has also sent worldwide messages to user activities providing updated disposition and disposal guidance.



RECOMMENDATIONS FOR CORRECTIVE ACTIONS

1. We recommend that the Army Chief of Staff implement the recommendation from the Inspector General, Department of Defense Audit Report No. 87-074, "Battery Products", February 2, 1987, to require a one-for-one turn-in and issue of batteries classified as hazardous waste.

3. We recommend that the Commander, Communications-Electronics Command, in his role as the Department of Defense single manager for batteries, develop, publish, and require proper distribution of a uniform policy for the proper storage, accountability, and disposal of lithium and magnesium batteries. The Commander also should expedite resolution of the dispute over the hazardous materiel status of magnesium batteries.

ARMY RESPONSE AND ACTION TAKEN

1. CONCUR WITH COMMENT. The Army agrees implementing such a procedure could help control disposal of batteries classified as hazardous waste. Although a one-for-one turn-in procedure may be desirable, there are several circumstances, which preclude wholesale implementation of this recommendation. For example, new or increased requirements would dictate that batteries be issued without a corresponding turn-in. The range of possible exceptions precludes policy, which would "require a one-for-one turn-in and issue of batteries."

Since the basis for the recommendation appears to be one of increased awareness and management at the local level, an alternative is to improve the guidance contained in AR 710-2, Supply Policy Below the Wholesale Level. The Army has taken action to add a section on a Hazardous Materials Management Program (HMMP) to Chapter 1 of AR 710-2. The section includes General Information as well as Major Command, Supply Support Activity (SSA), and Using Unit/Activity Responsibilities. The thrust of the Army's HMMP, to control hazardous materials, is to minimize hazards to public health and damage to the environment. Based on the new section, the unit/activity is responsible for the prompt turn-in of unneeded hazardous material to the SSA, and the SSA is responsible for processing unit/activity turn-ins of hazardous materials in a timely manner.

3. PARTIALLY CONCUR. The Commander CECOM is not the DOD single manager for batteries. The Recommendation should be to the Commander CECOM "in the management of batteries under his logistical responsibility...." In addition, part of the recommendation pertains to the local accountability of these batteries. This control is the responsibility of the local commander and is beyond the scope of CECOM'S jurisdiction. CECOM is willing to help commanders establish or revise local policy if requested.

In response to the recommendation, CECOM is taking the following actions:

- The next edition of Supply Bulletin 11-6 "Primary Battery Supply and Management Data" is scheduled for printing in the spring of 1993. This document will be distributed worldwide and will contain federal guidance for storage and disposal of lithium and magnesium batteries. It will also caution the user to check with local authorities to determine if more stringent state or local laws/regulation may be in effect.
- The CECOM Safety Office has published two editions of the CECOM Safety Office Publication entitled "Battery Disposition/Disposal Handbook", the latest edition is dated November 1988. Presently over 1775 user activities are on our mailing list for this pamphlet. In addition, two worldwide messages (i.e. DTG 051831Z May 92, and 241432Z Dec 92) have been sent regarding lithium, and magnesium battery safe handling, disposition, and disposal.
- The CECOM Safety Office has drafted Technical Bulletin (TB) 43-0134 in order to expand guidance coverage to all batteries managed by CECOM. It will replace the existing 1988 handbook. This TB covers all aspects of battery disposal including chemistry, safe handling, storage, packaging, transportation, disposition and disposal. TB 43-0134, Battery Disposition and Disposal, will be available by 30 September 1993. All user activities on the mailing list will be notified as soon as the new TB becomes available.
- The CECOM Safety Office had contracted for a magnesium battery toxicity study to resolve questions concerning its toxicity under the EPA hazardous waste regulation. The study's final report will provide the basis for future disposal recommendations to users of the BA-4386/U, and appropriate recommendations will be published in the pending TB 43-0134.

FINDING C. Testing of Lithium Batteries

The Services were not obtaining maximum usage from BA-5598 and BA-5590 lithium sulfur dioxide batteries before disposal. This occurred because field activities did not have the equipment necessary to test these batteries and determine their remaining useful capacity. As a result, the Services disposed of useful batteries and incurred unnecessary purchase and disposal costs. If this practice continues, the Services will dispose of more than \$60 million worth of useful batteries over the next 6 years if the rate of battery usage remains constant.

ADDITIONAL FACTS

None.

RECOMMENDATIONS FOR CORRECTIVE ACTIONS

1. We recommend that the Commander, Communications-Electronics Command, determine the number of BA-5598 and BA-5590 batteries a field unit must use per year in order to realize a savings through the purchase of a SOC unit and the implementation of a battery testing program.
2. We recommend that the Army Chief of Staff and the Marine Corps Commandant direct those field activities, for which a savings can be realized through battery testing, to procure SOC units and establish a program to test their BA-5598 and BA-5590 batteries before disposal.

ARMY RESPONSE AND ACTION TAKEN

1. CONCUR. In October 1991, CECOM conducted a cost analysis related to the use of state of charge (SOC) technology with lithium batteries. This study concluded that any field unit that uses more than 300 BA-5590's, or an equivalent number of BA-5598's, would find the purchase of a SOC meter cost effective. Since then, the cost of the meter has dropped by approximately 25 percent. Based on the new price, any unit that purchases an SOC meter and reuses 100 BA-5590's, or an equivalent number of BA-5598's, would recover the cost of the SOC meter. CECOM will publish an article in the "Supply and Maintenance Newsletter" to alert all users of the results of the above analysis.
2. CONCUR WITH COMMENT. Although the use of an SOC meter could reduce field activities' battery costs, it would be inappropriate for the Army leadership to direct such procurement. The decision to procure SOC meters must be based on battery usage, anticipated savings, and SOC meter costs. Any procurement must also consider existing assets.

CECOM has already fielded these meters on a limited basis to those units identified as heavy users of the BA-5598 and BA-5590 batteries. PM SINCGARS is also including these meters in the Total Package Fielding for the SINCGARS radio. We believe a better alternative is to advise large battery users that an SOC meter is available and recommend they consider requisitioning an appropriate number. After the CECOM article is published in the "Supply and Maintenance Newsletter", the ODCSLOG will send a message to MACOMs, with high battery usage, to advise them that the meters are available and that their use could reduce battery costs.

ARMY COMMENTS ON MONETARY BENEFITS

The DODIG stated: "...the Services will dispose of more than \$60 million worth of useful batteries over the next 6 years if the rate of battery usage remains constant." The key phrase is "if the rate of battery usage remains constant." Because of the ongoing reduction of active forces, it is unlikely that usage rates will remain constant. Rather, current projections suggest that active end strength will decrease by at least 25 percent over the next 6 years. Using this end-strength reduction as a basis, projected battery usage should also decline. Therefore, all things being equal, a potential cost avoidance of \$45 million appears to be a better estimate for the ensuing 6-year period.

# Department of the Navy



DEPARTMENT OF THE NAVY  
OFFICE OF THE ASSISTANT SECRETARY  
(Research, Development and Acquisition)  
WASHINGTON, D C 20350-1000

24 MAY 1993

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR  
GENERAL FOR AUDITING

Subj: DRAFT REPORT ON THE AUDIT OF THE BA-5598 LITHIUM SULFUR  
DIOXIDE AND THE BA-4386 MAGNESIUM BATTERIES (PROJECT  
NO. 2AB-5008)

Ref: (a) DoDIG Memo of 19 Mar 1993

Encl: (1) DoN Response to Draft Audit Report

I am responding to the draft audit report forwarded by  
reference (a).

The Department of the Navy response is provided as enclosure  
(1). As outlined in the enclosed comments, the Department has  
taken, or is planning to take, action to improve conditions found  
during the audit.

A handwritten signature in dark ink, appearing to read "Edward C. Whitman".

Edward C. Whitman

Copy to:  
NAVCOMPT (NCB-53)

DEPARTMENT OF THE NAVY COMMENTS  
ON  
DODIG AUDIT REPORT  
THE BA-5598 LITHIUM SULFUR DIOXIDE AND THE  
BA-4386 MAGNESIUM BATTERIES  
PROJECT NO. 2AB-5008

FINDING A. PROCUREMENT OF BATTERIES.

The Army is procuring excessive quantities of lithium sulfur dioxide and BA-4386 magnesium batteries. This is occurring because the information used to determine battery requirements is not accurate. As a result, the Army could unnecessarily spend as much as \$50 million to purchase additional batteries when a surplus already exists.

Recommendations:

A-1. "We recommend that the Army Chief of Staff direct user activities to perform a one-time inventory of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries to compare to approved stockage requirements and report any excess quantities to the Communications-Electronics Command item manager.

DoN Position:

Defer to the Army Chief of Staff.

A-2. "We recommend that the Marine Corps Commandant direct user activities to perform a one-time inventory of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries to compare to approved stockage requirements and report excess quantities to the Communications-Electronics Command item manager."

DoN Position:

Concur. CMC will send a message by 31 July 1993 to user activities directing an inventory of on-hand batteries. Inventory records will be corrected, and results will be compared to locally determined requirements and forwarded to the Communications-Electronics Command.

A-3. "We recommend that the Director, Defense Logistics Agency, conduct an inventory at depot storage activities of the BA-5598 lithium sulfur dioxide and the BA-4386 magnesium batteries, adjust stock balances accordingly, and report results to the Communications-Electronics Command item manager."

DoN Position:

Defer to Director, Defense Logistics Agency.

A-4. "We recommend that the Commander, Communications-Electronics Command, (a) terminate the current contract for BA-

4386 magnesium batteries; (b) adjust battery purchases to reflect accurate requirements; and (c) strengthen internal controls to restrict use of BA-5598 lithium sulfur dioxide batteries.

DoN Position:

Defer to the Commander, Communications-Electronics Command.

FINDING B. STORAGE, ACCOUNTABILITY, AND DISPOSAL:

Lithium and magnesium batteries were not being stored, accounted for, or disposed of in a uniform manner by the Department of Defense. This condition existed because no battery management plan adequately addressed policy, procedures, or guidance for the depots or user activities. As a result, there was confusion as to the proper shelf life of lithium and magnesium batteries and the Services cannot ensure proper disposal of all batteries. In addition, at one location the Defense Reutilization and Marketing Organization (DRMO) personnel were not paying the lowest price for disposal of the batteries.

Recommendations:

B-1. "We recommend that the Army Chief of Staff implement the recommendation from the Inspector General, Department of Defense, Audit Report No. 87-074, "Battery Products," February 2, 1987, to require a one-for-one turn-in and issue of batteries classified as hazardous waste."

DoN Position:

Defer to the Army Chief of Staff.

B-2. "We recommend that the Marine Corps Commandant implement the recommendation from the Inspector General, Department of Defense, Audit Report No. 87-074, "Battery Products," February 2, 1987, to require a one-for-one turn-in and issue of batteries classified as hazardous waste."

DoN Position:

Concur in principle. Current Marine Corps policies requiring a one-for-one turn in and issue of batteries classified as hazardous waste will be reiterated in the CMC message discussed in response to Recommendation A2 above.

B-3. "We recommend that the Commander, Communications-Electronics Command, in his role as the Department of Defense single manager for batteries, develop, publish, and require proper distribution of a uniform policy for the proper storage, accountability, and disposal of lithium and magnesium batteries. The Commander also should expedite resolution of the dispute over the hazardous material status of magnesium batteries."

DoN Comments:

It is suggested that SECOM coordinate any proposed DOD storage, accountability, or disposal policies with the Commander, Naval Surface Warfare Center, Crane, IN. NSWC Crane is the command responsible for batteries within the Department of the Navy; it is also responsible for the Standard Hardware Acquisition and Reliability Program (SHARP) for all DOD batteries, and publishes military standards concerning batteries.

FINDING C. TESTING OF LITHIUM BATTERIES.

The Services are not obtaining maximum usage from lithium sulfur dioxide batteries before disposal. A state of charge (SOC) battery tester has been developed which, if procured, could help avoid, by the auditors' computation, the disposal of more than \$60 million worth of useful batteries over the next 6 years.

Recommendations:

C-1. "We recommend that the Commander, Communications-Electronics Command, determine the number of BA-5598 and BA-5590 batteries a field unit must use per year in order to realize a savings through the purchase of a SOC unit and the implementation of a battery testing program."

DoN Position:

Defer to Commander, Communications-Electronics Command.

C-2. "We recommend that the Army Chief of Staff and the Marine Corps Commandant direct those field activities, for which a savings can be realized through battery testing, to procure SOC units and establish a program to test their BA-5598 and BA-5590 batteries before disposal."

DoN Position:

Concur in principle. The Marine Corps has been aware of the potential benefits of fielding state of charge testers and is studying their cost effectiveness and feasibility as a CMC mandated item.



# Defense Logistics Agency



DEFENSE LOGISTICS AGENCY  
HEADQUARTERS  
CAMERON STATION  
ALEXANDRIA, VIRGINIA 22304-6100



IN REPLY  
REFER TO DLA-CI

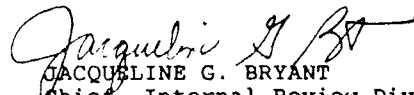
19 MAY 1993

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING,  
ACQUISITION MANAGEMENT DIRECTORATE,  
DEPARTMENT OF DEFENSE

SUBJECT: Draft Audit Report on the BA-5598 Lithium Sulfur  
Dioxide and BA-4386 Magnesium Batteries (Project  
Number 2AB-5008)

This is in response to your 19 March 1993 request.

2 Encl

  
JACQUELINE G. BRYANT  
Chief, Internal Review Division  
Office of Comptroller

CC:  
MMDOI (DLA-OC)

FORMAT 1 of 2

TYPE OF REPORT: AUDIT

DATE OF POSITION: 10 May 93

PURPOSE OF INPUT: INITIAL POSITION

AUDIT TITLE AND NO.: BA-5598 Lithium Sulfur Dioxide and the BA-4386  
Magnesium Batteries (Project No. 2AB-5008)

FINDING A: PROCUREMENT OF BA-5598 AND BA-4386 BATTERIES. The Army is procuring excessive quantities of BA-5598 lithium sulfur dioxide and BA-4386 magnesium batteries. This is occurring because the information used to determine battery requirements is not accurate. As a result, the Army could unnecessarily spend as much as \$50 million to purchase additional batteries when a surplus already exists.

DLA COMMENTS: Partially concur. DLA has no visibility of Army stock levels, user stock levels, or Army procurement action; therefore, DLA cannot comment on the totality of this finding. However, the DoD IG did indicate that depot records were not accurate. DLA acknowledges that in the past inventory functions were not fully executed at the depots cited in the report. During FY 92, DLA implemented an aggressive inventory accuracy program at all DLA depots that includes 100 percent location surveys, location reconciliation, and accomplishment of all required inventories. DLA's inventory accuracy program is designed to--and is--improving inventory accuracy at DLA depots.

INTERNAL MANAGEMENT CONTROL WEAKNESS:

- ( ) Nonconcur. (Rationale must be documented and maintained with your copy of the response.)
- (X) Concur; however, weakness is not considered material. (Rationale must be documented and maintained with your copy of the response.)
- ( ) Concur; weakness is material and will be reported in the DLA Annual Statement of Assurance.

ACTION OFFICER: Shelly Feeley, MMDOI, x77241, 4/13/93

PSE REVIEW/APPROVAL: Robert P. McFarlin, BG, USA, Execution Director  
(Distribution), MMD, x46771

DLA APPROVAL:



LAWRENCE P. FARRELL, JR.  
Major General, USAF  
Principal Deputy Director

FORMAT 2 of 2

TYPE OF REPORT: AUDIT

DATE OF POSITION: 18 May 93

PURPOSE OF INPUT: INITIAL POSITION

AUDIT TITLE AND NO.: BA-5598 Lithium Sulfur Dioxide and the BA-4386  
Magnesium Batteries (Project No. 2AB-5008)

RECOMMENDATION 3: We recommend that the Director, Defense Logistics Agency, conduct an inventory at depot storage activities of the BA-5598 lithium sulfur dioxide and the BA-4386 magnesium batteries, adjust stock balances accordingly, and report results to the Communications-Electronics Command item manager.

DLA COMMENTS: Concur with the intent of the recommendation. An inventory of BA-4386 magnesium and BA-5598 lithium sulfur dioxide batteries was conducted during the 2nd quarter FY 93 and the results reported to Communication-Electronics Command Item Managers. Based on the inventories the stock balances were reconciled.

DLA has in place processes for identifying discrepancies, conducting inventories, and adjusting stock balances as required. As the basis for inventory accuracy, depots perform location surveys to identify and correct any inaccuracies in the depot locator file. Discrepant locations are subjected to an inventory.

Next, the Army commands execute a quarterly location reconciliation with each depot storing their materiel. This reconciliation compares the depot custodial record to the Inventory Control Point (ICP) accountable record. Because the location reconciliation requires research and physical inventories of record imbalances, the depot records and ICP records will be reconciled within DoD established timeframes.

Through this process of location surveys, location reconciliation, and required inventories, depot and item manager records are reconciled and balanced continually.

DISPOSITION:

- ( ) Action is ongoing. Estimated Completion Date:
- (X) Action is considered complete.

RECOMMENDATION MONETARY BENEFITS: Non-monetary

DLA COMMENTS: N/A

ESTIMATED REALIZATION DATE: N/A

AMOUNT REALIZED: N/A

DATE REALIZED: N/A

INTERNAL MANAGEMENT CONTROL WEAKNESS:

- (x) Nonconcur. (Rationale must be documented and maintained with your copy of the response.)
- ( ) Concur; however, weakness is not considered material. (Rationale must be documented and maintained with your copy of the response.)
- ( ) Concur; weakness is material and will be reported in the DLA Annual Statement of Assurance.

ACTION OFFICER: Shelly Feeley, MMDOI, x77241, 4/13/93  
PSE REVIEW/APPROVAL: Robert P. McFarlin, BG, USA, Execution Director  
(Distribution), MMD, x46771  
DLA APPROVAL: Helen T. McCoy, Deputy Comptroller



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